

## Improvements for Reliability and Lifetime Test of a High-Performance DC Microwave Proton Source

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In order to carry out a long term CW proton source experiment, improvements and modifications were done on Peking University compact permanent magnet 2.45 GHz ECR source(PKU PMECRs), faraday cup and the circumstance on PKU ion source test bench. At the beginning of 2015, a continuous operation of PKU PMECRs for 306 hours with more than 50 mA DC beam was carried out. Total beam availability, which is defined as 35-keV beam-on time divided by elapsed time, was higher than 99%. No plasma generator failure or high voltage breakdown was observed during that running period and the proton source reliability is near 100%[1]. A re-inspect was performance after another additional 100 hours operation (counting time) and no obvious sign of component failure was observed. Counting the previous running time together, this PMECRs longevity is now demonstrated to be greater than 450 hours. Details of the improvements will be given in the paper.

### Reference

[1] Shixiang PENG, Ailin ZHANG, Haitao REN, Tao ZHANG, Yuan XU, Jingfeng ZHANG, Jianhua GONG, Zhiyu GUO and Jia'er CHEN, Note: Continuous operation of 2.45 GHz microwave proton source for 306 hours with more than 50 mA DC beam. Accepted by Chinese Physics B on 14 April, 2015.